

DATE

Permit: APC-97/0503-CONSTRUCTION (Amendment 10)(NSPS) – CCUs I and II
Delaware City Refinery
CCU Selective Catalytic Reduction (SCR) System Project

Delaware City Refining Company
4550 Wrangle Hill Road
Delaware City, DE 19706

ATTENTION: Jose Dominguez
Refinery Manager

Dear Mr. Dominguez:

Pursuant to 7 **DE Admin. Code** 1102, Section 2.1.3, approval of the Department of Natural Resources and Environmental Control is hereby granted for the modification of two (2) combined cycle units (CCUs) each consisting of a General Electric Model PG6101FA Gas Turbine rated at 780 mmBtu/hour (HHV) with a Natural Gas/Refinery Fuel Gas Fired Duct Burner (DB) rated at 192 mmBtu/hr (HHV), a Nooter Erikson Heat Recovery Steam Generator (HRSG) and electric generator rated at 77 MW nominal by the installation of a Turner Envirologic Inc. Selective Catalytic Reduction (SCR) System downstream of each HRSG located at the Delaware City Refinery's Delaware City Power Plant, Delaware City, Delaware in accordance with the following documents:

- Application submitted on Forms AQM-1, AQM-2, AQM-3.1, AQM-4.9 and AQM-5 dated October 23, 2013 and signed by Herman Seedorf.
- Electronic mails to Ravi Rangan from Larry Boyd dated 03.18.2014 and 03.27.2014 and electronic mail to Ravi Rangan from Thomas Godlewski dated 03.28.2014.

This permit is issued subject to the following conditions:

1. **General Provisions**

- 1.1. The CCU SCR Project shall be constructed in accordance with the application and this permit. If any changes are necessary, revised plans must be submitted and supplemental approval issued prior to actual construction. Construction authorization expires 3 years after issuance of this permit.
- 1.2. Representatives of the Department may, at any reasonable time, inspect this facility.
- 1.3. This permit may not be transferred to another location or to another piece of equipment or process.

Delaware City Refining Company

Permit: APC-97/0503-CONSTRUCTION (Amendment 10)(NSPS) – CCUs I and II

CCU SCR Project

DATE

Page 2

- 1.4. This permit may not be transferred to another person, owner, or operator unless the transfer has been approved in advance by the Department. Approval (or disapproval) of the permit transfer will be provided by the Department in writing. A request for a permit transfer shall be received by the Department at least 30 days before the date of the requested permit transfer. This request shall include:
 - 1.4.1 Signed letters from each person stating the permit transfer is agreeable to each person; and
 - 1.4.2 An Applicant Background Information Questionnaire pursuant to 7 Del C, Chapter 79 if the person receiving the permit has not been issued any permits by the Department in the previous 5 years.
- 1.5 A separate application to operate pursuant to 7 **DE Admin. Code** Regulation No. 1102 does not need to be submitted to the Department for the equipment or process covered by this permit. The Company shall notify the Department within 5 days of the completion of the construction of the CCU SCR System Project and shall schedule an on-site system inspection within 30 days
- 1.6 The provisions of 7 **DE Admin. Code** 1102, Sections 2.1 and 11.3 shall not apply to the operation of equipment or processes for the purposes of initially demonstrating satisfactory performance to the Department of the CCU SCR System Project following construction, installation, modification, or alteration of the equipment or processes.
- 1.7 The Company shall not initiate construction, install, or alter any equipment or facility or air contaminant control device which will emit or prevent the emission of an air contaminant prior to submitting an application to the Department pursuant to 7 **DE Admin. Code** 1102, and, when applicable 7 **DE Admin. Code** 1125, and receiving approval of such application from the Department; except as authorized by this permit or exempted in 7 **DE Admin. Code** Regulation No. 1102 Section 2.2.
- 1.8 The owner or operator shall submit a complete supplement to the Title V permit application pursuant to the 7 **DE Admin. Code** 1130 Section 5.2 within 12 months of requesting a permit to operate. The application shall address all applicable requirements including those of 40 CFR Part 64 (Compliance Assurance Monitoring) if applicable.

2. Emission Limitations

- 2.1 Air contaminant emission levels from each CCU shall not exceed the following and those specified by 7 **DE Admin. Code** 1100¹:
 - 2.1.1 NO_x:
 - 2.1.1.1 NO_x emissions from each CCU shall not exceed the levels specified in Table 1 below on an hourly basis:

¹ For the purpose of this condition, "TPY" is defined as "tons emitted in any rolling twelve month period". All lb/mmBtu limits shall be on an hourly basis.

Delaware City Refining Company**Permit: APC-97/0503-CONSTRUCTION (Amendment 10)(NSPS) – CCUs I and II****CCU SCR Project**

DATE

Page 3

Table 1: NO_x Emission Limits

Scenario	Proposed Limit ppmvd @ 15 % O₂
With SCR in Operation	
CCU on NG without duct firing	3
CCU on NG with duct firing	3.6
Without SCR in Operation	
CCU on NG without duct firing	15
CCU on NG with duct firing	18

2.1.1.2 The owner/operator must comply with the "Facility-wide Emission Limit for Nitrogen Oxides (NO_x)" contained in Part 1, Condition 3, Table 1.j of AQM-003/00016.

2.1.2 SO₂:

2.1.2.1 36.5 TPY

2.1.3 CO:

2.1.3.1 0.0202 lb/mmBtu when firing NG in the CCUs

2.1.3.2 0.0261 lb/mmBtu when firing NG in the CCUs and RFG in the DBs

2.1.3.3 110.9 TPY

2.1.4 PM₁₀ (including H₂SO₄) as measured by the average of the three stack test runs conducted pursuant to Condition 4.3:

2.1.4.1 0.0074 lb/mmBtu when firing NG in the CCUs

2.1.4.2 0.0099 lb/mmBtu when firing NG in the CCUs and RFG in the DBs

2.1.4.3 67 TPY

2.1.5 TSP as measured by the average of the three stack test runs conducted pursuant to Condition 4.3:

2.1.5.1 0.0115 lb/mmBtu when firing NG in the CCUs

2.1.5.2 0.0112 lb/mmBtu when firing NG in the CCUs and RFG in the DBs

2.1.5.3 47.8 TPY

2.1.6 VOC as measured by the average of the three stack test runs conducted pursuant to Condition 4.3:

2.1.6.1 0.0021 lb/mmBtu when firing NG in the CCUs

2.1.6.2 0.0046 lb/mmBtu when firing NG in the CCUs and RFG in the DBs

2.1.6.3 19.8 TPY

2.1.7 H₂SO₄ as measured by the average of the three stack test runs conducted pursuant to Condition 4.3:

4.1 TPY

Delaware City Refining Company

Permit: APC-97/0503-CONSTRUCTION (Amendment 10)(NSPS) – CCUs I and II

CCU SCR Project

DATE

Page 4

2.1.8 Pb:
0.004 TPY

2.1.9 NH₃:

2.1.9.1 5 ppmvd @ 15 % O₂ with SCR in operation

2.1.9.2 0 ppmvd without SCR in operation

2.1.9.3 34.3 TPY

2.2 Neither CCU shall emit visible air contaminants exceeding 20% opacity for an aggregate of more than 3 minutes in any 1 hour period, or more than 15 minutes in any 24 hour period.

2.3 Odors from this source shall not be detectable beyond the plant property line in sufficient quantities such as to cause a condition of air pollution.

3. Operational Limitations:

3.1 Only NG may be fired in the combustion chambers of the CCUs. Only NG or desulfurized RFG with a hydrogen sulfide content less than 0.1 grain/dscf on a 3-hour rolling average may be fired in the DBs.

3.2 Except as provided by Condition 3.3.2, the CCUs shall not be operated unless the LNBs and SCR systems (when SCR is available) are operating properly. Compliance with the emission limitations in 2.1.1 shall constitute proper operation.

3.2.1 The owner or operator shall operate the SCR system for each CCU in accordance with manufacturer's recommendations. Each SCR system shall be operated at all times that it is available, excluding periods of startup, shutdown, or malfunction.

3.2.2 The SCR system is considered available except during periods of planned maintenance or malfunction as defined in Condition 3.2.3 of the SCR system.

3.2.3 "Malfunction" means any sudden and unavoidable failure of air pollution control equipment or process equipment or of a process to operate in a normal or usual manner, and that causes the source to exceed a technology based emission limitation under the permit, due to unavoidable increases in emissions attributable to the malfunction. An emergency or malfunction shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

3.3 Startup and shutdown exceptions:

3.3.1 CO emissions concentration limitations specified in Condition 2.1.3 shall not apply for two hours following startup or for two hours preceding shutdown of the combustion turbines and/or duct burners. The Company shall follow good air pollution control practices to minimize CO emissions during these periods.

3.3.2 NO_x emission rates from the CCUs shall not exceed 390 ppmv(dry) at 15 % O₂ for a period of 24 hours after cold startup of the CCU.

Delaware City Refining Company

Permit: APC-97/0503-CONSTRUCTION (Amendment 10)(NSPS) – CCUs I and II

CCU SCR Project

DATE

Page 5

3.4

3.4.1 At all times, including periods of startup, shutdown, and malfunction, the owner or operator shall, to the extent practicable, maintain and operate the facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions.

3.4.2 All structural and mechanical components shall be maintained in proper operating condition.

4. Compliance Methodology, Testing and Monitoring Requirements

4.1 Compliance with Condition 2.1.1 shall be demonstrated using a Continuous Emissions Monitoring Systems (CEMS) for NO_x and O₂. The CEMS shall conform to the applicable Performance Specifications in 40 CFR, Part 60, Appendix "B" and the Quality Assurance/Quality Control (QA/QC) procedures for NO_x CEMS in accordance with 40 CFR Part 60, Appendix "F".

4.2 Compliance with Condition 2.1.3 shall be demonstrated by using CEMS on the CCUs.

4.3 Compliance with Conditions 2.1.4, 2.1.5, 2.1.6, and 2.1.7 shall be demonstrated using annual stack test based emissions factors and fuel flow rates for the CCUs and duct burners.

4.4 Compliance with Conditions 2.1.2 and 2.1.8 shall be based on firing only NG in the CCUs and either NG or desulfurized RFG in the DBs.

4.5 Compliance with Condition 2.1.9 shall be based on monitoring the stack gas by obtaining weekly grab samples from a location downstream of the SCR system using a department approved method. The Company may request the Department for approval of less frequent monitoring if 24 consecutive sampling events indicate the ammonia slip to be less than 2 ppmvd @ 15 % O₂.

4.6 Compliance with Conditions 2.2 shall be based on daily qualitative stack observations to determine the presence of any visible emissions when the units are in operation.

4.6.1 If visible emissions are observed, the Company shall take corrective actions and/or conduct a visible observation in accordance with Paragraph 4.6.3 below.

4.6.2 If no visible emissions are observed, no further action is required.

4.6.3 If required under Condition 4.6.3 above, the Company shall, in accordance with Subsection 1.5(c) of Regulation No. 20, conduct visual observations at fifteen-second intervals for a period of not less than one hour except that the observations may be discontinued whenever a violation of the standard is recorded. The additional procedures, qualification and testing to be used for visually determining the opacity shall be those specified in Section 2 & 3 (except for Section 2.5 and the second sentence of Section 2.4) of Reference Method 9 set forth in Appendix A, 40 CFR, Part 60, revised July 1, 1982.

4.7 The Company shall conduct the following stack tests annually:

4.7.1 EPA Reference Method 5 for TSP

4.7.2 EPA Reference Method 5B/202 for PM₁₀, including H₂SO₄

Delaware City Refining Company

Permit: APC-97/0503-CONSTRUCTION (Amendment 10)(NSPS) – CCUs I and II

CCU SCR Project

DATE

Page 6

4.7.3 EPA Reference Method 25 A for VOC

4.7.4 EPA Reference Method 8 for H₂SO₄

4.7.5 Within 90 days after achieving the maximum production rate at which the facility will be operated, but not later than 180 days after initial startup of such facility, the owner or operator shall conduct performance test(s) and furnish the Department with a written report of the results of such performance test(s) in accordance with the following general provisions:

4.7.5.1 One original and 2 copies of the test protocol shall be submitted a minimum of 30 days in advance of the tentative test date to the address in Condition 6.3. The tests shall be conducted in accordance with the State of Delaware and Federal requirements.

4.7.5.2 The test protocol shall be approved by the Department prior to initiating any testing. Upon approval of the test protocol, the Company shall schedule the compliance demonstration with the Air Surveillance and Engineering & Compliance Branches. The Department must observe the test for the results to be considered for acceptance, unless the Department determines in advance, in writing, that the test need not be observed. Further, the Department may in its discretion determine based on its observation of the test that it need not observe the entire test.

4.7.5.3 The final results of the testing shall be submitted to the Department within 60 days of the test completion. One original and 2 copies of the test report shall be submitted to the addresses below:

Original and One Copy to:
Engineering & Compliance Branch
Attn: Assigned Engineer
655 S. Bay Road, Suite 5N
Dover, DE 19901

One Copy to:
Air Surveillance Branch
Attn: Program Manager
715 Grantham Lane
New Castle, DE 19720

4.7.5.4 To be considered valid, the final results report shall include the emissions test report (including raw data from the test) as well as a summary of the results and a statement of compliance or non-compliance with permit conditions signed by a member of the Company's Health, Safety and Environment department.

4.7.5.5 The results must demonstrate to the Department's satisfaction that the emission unit is operating in compliance with the applicable regulations and conditions of this permit; if the final report of the test results shows non-compliance the owner or operator shall propose corrective action(s). Failure to demonstrate compliance through the test may result in enforcement action.

4.7.5.6 The Company may petition the Department for less frequent testing if future data shows that testing on an annual basis is unwarranted.

4.8 Compliance with Condition 3.1 with respect to the H₂S concentration in RFG shall be based on a continuous monitoring device. This instrument shall be installed for continuously monitoring and recording the concentration (dry basis) of H₂S in RFG before it is

Delaware City Refining Company

Permit: APC-97/0503-CONSTRUCTION (Amendment 10)(NSPS) – CCUs I and II

CCU SCR Project

DATE

Page 7

combusted in any fuel burning device. The instrument shall be located downstream of all process steps which impact the composition of RFG prior to its being combusted in any fuel burning device. These instruments shall conform to the QA/QC requirements of Appendix "F" in 40 CFR 60.

- 4.9 Compliance with Conditions 3.2 through 3.4 shall be based on the record keeping requirements and on information available to the Department, which may include, but is not limited to, monitoring results, opacity and process operating data.
- 4.10 Department representatives shall be given the opportunity to witness all stack emission testing and monitor certification testing including any test audits conducted on the monitors as part of the Quality Assurance Program.

5. Record Keeping Requirements

- 5.1 The Company shall maintain all records necessary for determining compliance with this permit in a readily accessible location for 5 years and shall make these records available to the Department upon written or verbal request.
- 5.2 The following records shall be maintained for a period of 5 years:
 - 5.2.1 Log of all operating hours of each CCU and DB
 - 5.2.2 Rolling 24-hour heating value of the RFG combusted;
 - 5.2.3 All 3-hour rolling averages of the H₂S content in RFG as measured by the H₂S analyzer;
 - 5.2.4 CEMS data including calibration log and results of all Cylinder Gas Audits and all Relative Accuracy Test Audits.

6. Reporting Requirements

- 6.1 Emissions in excess of any permit condition or emissions which create a condition of air pollution shall be reported to the Department immediately upon discovery and after activating the appropriate site emergency plan, in the following manner:
 - 6.1.1 By calling the Department's Environmental Emergency Notification and Complaint number (800) 662-8802, if the emission poses an imminent and substantial danger to public health, safety or to the environment.
 - 6.1.2 Other emissions in excess of any permit condition or emissions which create a condition of air pollution may be called in to the Environmental Emergency and Complaint number (800) 662-8802 or faxed to (302) 739-2466. The ability to fax in notifications may be revoked upon written notice to the Company by the Department in its sole discretion.
- 6.2 In addition to complying with Condition 6.1 of this permit, the Owner/Operator shall satisfy any reporting required by the "Reporting of a Discharge of a

Delaware City Refining Company

Permit: APC-97/0503-CONSTRUCTION (Amendment 10)(NSPS) – CCUs I and II

CCU SCR Project

DATE

Page 8

Pollutant or an Air Contaminant" regulation, within 30 days of becoming aware of an occurrence subject to reporting pursuant to these conditions. All reports submitted to the Department shall be submitted in writing and shall include the following information:

- 6.2.1 The name and location of the facility;
 - 6.2.2 The subject source(s) that caused the excess emissions;
 - 6.2.3 The time and date of the first observation of the excess emissions;
 - 6.2.4 The cause and expected duration of the excess emissions;
 - 6.2.5 For sources subject to numerical emission limitations, the estimated rate of emissions (expressed in the units of the applicable emission limitation) and the operating data and calculations used in determining the magnitude of the excess emissions; and
 - 6.2.6 The proposed corrective actions and schedule to correct the conditions causing the excess emissions.
 - 6.2.7 Emissions on the same day from the same emission unit may be combined into one report. Emissions from the same cause that occur contemporaneously may also be combined into one report.
 - 6.2.8 The Company shall submit an electronic copy of all required reports to the Department's compliance engineer assigned to the Refinery.
- 6.3 The owner/operator shall notify the Department within thirty (30) days of a determination that an SCR system governed by this permit will be unavailable for a period exceeding 2 consecutive calendar days.
- 6.3.1 Such notifications shall include:
 - 6.3.1.1 Reason for unavailability
 - 6.3.1.2 Anticipated duration
 - 6.3.1.3 Steps being taken to minimize duration of unavailability and magnitude of emissions during this period
 - 6.3.1.4 Alternatives considered
 - 6.3.1.5 Anticipated effect of unavailability on compliance with NOx cap.
- 6.4 Send one (1) original to:
Director
Division of Air Quality
655 S. Bay Road, Suite 5N
Dover, DE 19901
- and one (1) copy of all required reports to:

Delaware City Refining Company

Permit: APC-97/0503-CONSTRUCTION (Amendment 10)(NSPS) – CCUs I and II

CCU SCR Project

DATE

Page 9

Program Manager
Engineering and Compliance Branch
Air Quality Management Section
715 Grantham Lane
New Castle, DE 19720

7. Administrative Conditions

- 7.1 This permit shall be available on the premises.
- 7.2 The Company shall notify the Department in writing prior to making any material changes which cause these units to fall under the authority of Title IV of the Clean Air Act.
- 7.3 Failure to comply with the provisions of this permit constitutes good cause for suspension or revocation of this permit.

Sincerely,

Paul E. Foster, P.E.
Program Manager
Engineering & Compliance Branch

PEF:CRR:slb
F:\ENGandCOMPLIANCE\CRR\crr14027.doc

pc: Dover Title V File
Dawn Minor